and translocation as described here to earlier attempts to produce giant proteoliposomes is that all proteins are built into the vesicle membrane in the correct orientation. Our novel cell model opens up the possibility to study e.g. protein synthesis in vitro with single-molecule microscopy.
[1] S. Fenz, R. Sachse, S. Kubick and T. Schmidt; BPJ 2012, 102(3), pp18a

3537-Pos Board B692
High throughput Lipid Bilayer Platform
Bin Lu, Gayane Kocharyan, Jacob Schmidt.
UCLA, Los Angeles, CA, USA.
Artificial lipid bilayers are well established for use in scientific studies of reconstituted ion channels and as a platform to host engineered pore proteins for sensing, including DNA sequencing. Droplet bilayers have recently been shown to be especially compatible with technological applications, with recently demonstrated automation, parallelization, and ion channel drug potency measurements. To expand the range of potential applications, we have been working to simplify droplet bilayer formation and ion channel measurement. We have developed a chip for droplet bilayer formation and measurement that only requires fluid dispensation. Using an array design of this chip, 32 bilayers were simultaneously formed with no operator feedback at a yield of approximately 80%. Cycling this process resulted in the formation and measurement of 96/120 bilayers in 80 minutes, a rate which could greatly increase with automation and greater parallelization. We also used these arrays to measure the α-hemolysin and VDAC channels.

3538-Pos Board B693
Molecular Dynamics of Peptide Folding and Aggregation at the Vapor-Water Interface
Christoph Globisch, Mara Jochum, Christine Peter.
Max Planck Institute for Polymer Research, Mainz, Germany.
Hyrophobic-hydrophilic interfaces such as the water-vapor or other liquid-liquid or solid-liquid interfaces have large effects on the secondary structure formation and aggregation processes of amphiphilic peptides. Due to the dual nature of these peptides, they are surface active or tend to self assemble to minimize the exposed fraction of unsolvable surface. In our study, we investigate representatives of two different families of amphiphilic peptides in solution and at the vapor-water interface: β-sheet forming peptides (containing repetitive sequences of hydrophobic/hydrophilic residues), which self-assemble into monolayers at the air−water interface [1], and an anionic α-helical amphiphilic cell penetrating peptide (CPP) [2]. The aggregated acidic β-sheet peptides can serve as a template to promote mineralization processes taking place at an interface. Whereas the studied CPP GALA belongs to a relatively small class of anionic helix building peptides. The CPPs are promising tools for targeting intracellular proteins and might be useful in the development of new delivery systems for therapeutics. We investigate the coupling between secondary structure formation, partitioning at the interface, and self-aggregation at the microscopic level in atomistic molecular dynamics simulations with the aim of gaining insight into the interactions which govern the structure formation at the local scale. Since processes taking place at longer time scales or larger system sizes are hardly accessible to atomistic simulations, we utilize the information gathered from atomistic simulations to develop a fragment-based coarse-grained model which can be applied to inhomogeneous systems with interfaces.
1. Rapaport, H., Grisaru, H. and Silberstein, T., Adv. Funct. Mater. 18, 2889-2896 (2008)
2. Lia W., Nicol F. and Szoka Jr., F.C., Adv. Drug Deliv. Rev. 56, 967-985 (2004)

3539-Pos Board B694
Impact of Initial Vascular Permeability and Recovery Speed of Disrupted Blood-Brain Barrier on Nanodrug Delivery into the Brain Tissue
Kuo-Wei Lu[1], Hsin-Yu Wu[1], Chih-Kang Huang[2], Tzyy-Leng Horng[3], Cheng-Ying Chou[2], Win-Li Lin[1,4].
[1]Institute of Biomedical Engineering, National Taiwan University, Taipei, Taiwan, [2]Department of Bio-Industrial Mechatronics Engineering, National Taiwan University, Taipei, Taiwan, [3]Department of Applied Mathematics, Feng Chia University, Taichung, Taiwan, [4]Division of Medical Engineering Research, National Health Research Institutes, Miaoli, Taiwan.
Delivery of drugs across Blood-brain barrier (BBB) can be enhanced by physical stimulation (e.g. ultrasound). When BBB is opened by ultrasound sonication in the presence of microbubbles, its vascular permeability will decay due to BBB repairing. The transport and accumulation of nanodrugs in brain tissue is affected by both physicochemical properties of drugs and closure dynamics of BBB. In this study, we developed a mathematical model and employed animal experiments to investigate the impact of recovery of disrupted BBB on nanodrug delivery into brain tissue. We chose Evans blue (EB)-albumin complexes as a model nanodrug and studied the effects of initial permeability, decaying speed of permeability and half-life of EB-albumin complexes on their spatial-temporal concentration response and accumulation in brain tissue. The transport parameters used in this model were obtained from previously published studies and the fitting of our experimental data with Particle Swarm Optimization (PSO). The simulation results showed that there exists optimal initial permeability and decaying speed of permeability to achieve a maximum AUC (area under the concentration-time curve) of EB-albumin in the brain tissue. The results indicate that we can enhance the accumulation of nanodrugs safely in brain tissue by controlling the recovery dynamics of BBB opening.

3541-Pos Board B696
Electrical Properties of Sucrose Solutions for Diabetic Applications
Christopher E. Bassey, Sammy Cowell.
Azusa Pacific University, Azusa, CA, USA.
Knowledge of the dielectric properties of body fluids such as blood, urine, and sweat can provide information on their water and glucose contents. This information is particularly important for monitoring glucose level in individuals who suffer from diabetes. We measured the dielectric constant, dielectric loss factor, and alternating current (ac) conductivity for various concentrations of sucrose solutions ranging from 0.1 to 1M. We also measured urine samples from diabetics. We used an Agilent E5071C Network Analyzer coupled to a Dielectric probe for measurements between 100 and 3000 MHz frequency range at an average room temperature of 22.5 ± 0.5 ^{o} C. Results show a gradual decrease in dielectric constant with molarity over the frequency range covered. The dielectric loss factor and the ac conductivity both showed steady increases with molarity. Results for pre-meal and post-meal urine samples from diabetic individuals showed increases in dielectric loss and ac conductivity in post-meal samples. These increases were attributed to higher glucose level in post-meal urine. This work suggests that dielectric data could be useful in monitoring glucose level in diabetics.

3542-Pos Board B697
Next Generation Hemoglobin Based Oxygen Carrier, Oxyvita C, with Coagulation Capacity using a Modified Lyophilization Process: Protection of Components
John P. Harrington[1], Hanna Wollocko[2], Artur Wollocko[3], Edyta Kostecki[1].
[1]SUNY New Paltz, New Paltz, NY, USA, [2]OxyVita, Inc, New Windsor, NY, USA, [3]OxyVita Inc, New Windsor, NY, USA.
OxyVita, Inc. has developed proprietary technology to lyophilize a next generation Hemoglobin-Based-Oxygen-Carrier (HBOC) and coagulation components (plasma and platelets) without altering the specific properties of these components. The average molecular weight (17MDa) and hydrodynamic radius (36nm) of the OxyVita C polymers are similar to the solution form from which the powder is produced, indicating no protein dissociation or unfolding during lyophilization. The reconstitution of OxyVita C powder is ~15 sec. in water. The liquid form of this HBOC is currently in pre-clinical studies as a dedicated oxygen delivery protein. The proprietary process which affords specific molecular protection to OxyVita C has now been applied to protect lyophilized human coagulation components (plasma and/or platelets). Natural platelets have a shelf life limited of 5 days. By implementing this protection technology, it is possible to extend the storage of freeze-dried platelets for at least 30 days, maintaining functionality as evident from repeated coagulation studies using a PAP-8 analyzer (Bio-Data).These studies exhibited the same coagulation capacity as fresh plasma or platelets (~78%) using a PAP-8 analyzer. After 30 days of powder storage, a decrease of only 7% activity was observed. Solubility of the powder platelets was ~10 sec. Reconstitution in different (IV) fluids has been shown *in vitro* with these preparations. Consistent results with 6 batches of powder plasma and 12 batches of powder platelets produced to date have been observed. Availability of each product provides flexibility for an appropriate treatment mode for a clinical situation, allowing: 1) only use the oxygen delivery component (OxtVita C) in the powder form; 2) a combination of OxyVit C with coagulation capacity (multifunctional resuscitation fluid); or 3) only coagulation enhancement using either dried plasma or platelets.